C10. CHAPTER 10
CONTINGENCIES, COMBAT OPERATIONS, MILITARY OPERATIONS OTHER THAN WAR (MOOTW), AND ASSOCIATED TRAINING

C10.1. GENERAL

C10.1.1. This chapter provides the minimum criteria for contingencies, combat operations, military operations other than war (MOOTW), and associated training. Full compliance with other chapters of this Standard may not be possible during such operations. The DoD Components may establish implementing regulations that are more protective than this Standard. In situations involving combined or joint operations, the Commanders of the Combatant Commands or the U.S. Commander of a Joint Task Force (JTF) shall designate the DoD Component's explosives safety criteria to be used.

C10.1.2. The provisions of this chapter only apply to:

C10.1.2.1. Those DoD AE activities located outside the United States.

C10.1.2.2. The Commanders of the Combatant Commands, the U.S. Commanders of JTF, or the DoD Component Commanders in the management of these DoD AE activities. When necessary, commanders may delegate certain explosive safety responsibilities to designated subordinate commanders to ensure appropriate controls.

C10.1.2.3. Contingency, combat, and MOOTW training, regardless of location, when specifically authorized by applicable DoD Component headquarters or Combatant Commander. Prior to approval of this training, a risk analysis that thoroughly assesses asset preservation and identifies the risk associated with the training shall be conducted. QD separations provided for asset preservation shall be used for training, except where Chapter 9 permits lesser distances to be used.

C10.1.3. This chapter provides optional criteria and risk management tools not available elsewhere in this Standard. These optional criteria provide greater protection (asset preservation distance) for assets deemed sufficiently critical to warrant the greater protection, and, in some circumstances, provide lesser protection (minimum separation distance) for those assets for which the mission requirements outweigh the increased risk to those assets.

C10.1.3.1. Asset Preservation Distance. At this distance from the PES, assets at the ES are expected to be usable and mission capability is maintained following an incident. This separation distance should prevent propagation between PES. (See subparagraphs C2.2.5.5. and C2.2.5.6. for expected consequences for these separation distances.)

C10.1.3.2. Minimum Separation Distance. At this distance from the PES, mission capability will likely be impaired or delayed. This separation distance should prevent prompt propagation; however, late time propagation between PES is possible. (See subparagraphs C2.2.5.2., C2.2.5.3., and C2.2.5.4. for expected consequences for these separation distances.)

C10.2. RISK MANAGEMENT

Consistent with operational requirements, it is DoD policy to manage risks associated with AE (See section C1.2.). Exceptions to this chapter's criteria are where equivalent protection is provided or where a risk analysis is performed, as follows:

C10.2.1. Equivalent Protection. Analysis determining that protective construction or other specialized safety features provides a level of protection equivalent to the separation distances required by this Standard.

C10.2.2. Risk Analysis. Analysis determining that an acceptable level of safety is provided. Risk analysis is a systematic procedure consisting of the following four steps:

C10.2.2.1. An event analysis to identify and describe possible events such as the location, type of occurrence, probability of occurrence, and quantity of explosives.

C10.2.2.2. An effects analysis of the effects of the possible events to persons in the surroundings such as blast pressure, fragmentation, and thermal hazards.

C10.2.2.3. An exposure analysis of the places, protection and time history of exposed personnel in the hazardous areas.

C10.2.2.4. A risk calculation.

C10.2.3. Risk Management Control. The action a commander takes to minimize acceptable risk. Such actions shall include:

C10.2.3.1. Development, implementation, and enforcement of applicable control measures used to eliminate the hazard or reduce its risk.

C10.2.3.2. Continuous evaluation of the effectiveness of the implemented control measures.

C10.3. SITE PLAN PROCESS

C10.3.1. Site Approval. All explosives locations falling within the scope of this Chapter shall be approved by the applicable commander or by the DDESB as outlined below. Site plan packages shall be submitted:

C10.3.1.1. For AE locations such as the following:

C10.3.1.1.1. Storage Locations.

C10.3.1.1.2. Holding areas (e.g., Basic Load Ammunition Holding Areas (BLAHA), flight line holding areas, port and railhead holding areas, and marshalling areas).

C10.3.1.1.3. Handling and operating locations (e.g., HAS, ports, AE maintenance, repair, and renovation areas and sling-out areas).

C10.3.1.1.4. Forward Arming and Refueling Points (FARP).

C10.3.1.1.5. Combat Aircraft Parking Area (CAPA) and cargo aircraft parking areas.

C10.3.1.1.6. Static missile batteries.

C10.3.1.1.7. Locations used for the treatment or disposal (e.g., open burn or open detonation) of munitions. Exceptions are those locations used in an emergency response, for burning excess propellant resulting from munitions use during training, and those involved in direct combat operations.

C10.3.1.2. Non-AE related ES within QD arcs.

C10.3.2. Documentation requirements. The operational situation and the type and duration of the AE operations conducted at the site or facility determine the type of documentation required for a site approval. The following categories of operations apply:

C10.3.2.1. Permanent.

C10.3.2.1.1. Definition. Those AE-related facilities where operations are expected to continue for more than 12 months.

C10.3.2.1.2. Documentation Requirement. A DDESB-approved site plan for such locations must be obtained once the Commander of the Combatant Commands or DoD Component headquarters, as applicable, determines operations shall require the facilities' use to continue beyond 12 months.

C10.3.2.2 Recurrent

C10.3.2.2.1. Definition. Those AE-related facilities where operations are expected to occur on a periodic basis regardless of the duration of the operation. These locations may be sited using compensatory actions, such as facility evacuation or change-of-use, to minimize the risks associated with AE operations.

C10.3.2.2.2. Documentation Requirement. These locations must have a DDESB-(or appropriate level of command when applicable) approved site plan before commencing operations.

C10.3.2.3. Temporary

C10.3.2.3.1. Definition. Those AE-related facilities where operations are not expected to continue for more than 12 months and are not recurrent, or for which advanced planning and approval are impractical.

C10.3.2.3.2. Documentation Requirement. A plan for the specific scenario shall be approved by the applicable commander. The plan shall include the following:

C10.3.2.3.2.1. A risk assessment for the proposed operation. This assessment shall weigh the need for the facility against the potential effects of an accident (e.g., mission impact, loss of resources, turnaround times).

C10.3.2.3.2.2. Schedule for the cessation of explosives operations or submittal of a site plan if the operations exceed 12 months.

C10.3.2.4. Contingency, Combat, and MOOTW Training

C10.3.2.4.1. Definition. Those operations that simulate real world combat environments using live AE to achieve training goals.

C10.3.2.4.2. Documentation Requirement. Facilities or areas for training activities shall have a DDESB-approved site plan for permanent or recurrent operations, or a risk analysis approved by the applicable commander for temporary operations.

C10.3.3. Site Plan Packages. See section C5.4. for the requirements with the following additions:

C10.3.3.1. In the absence of suitable maps or drawings, information (e.g., sketches, photographs, or other information) may be provided.

C10.3.3.2. An explanation of any deviations from pertinent safety standards caused by local conditions.

C10.3.3.3. A copy of the risk analysis performed by the DoD Component, if one was performed, to demonstrate equivalent protection.

C10.3.4. Approval Authority for Waivers and Exemptions. The Commander of the Combatant Commands, the U.S. Commander of JTF, or the DoD Component Commander may, for strategic and other compelling reasons, authorize waivers to the explosives safety standards contained herein for the planning or conduct of contingencies, combat operations and MOOTW. All waivers shall be coordinated with the host nation, as required, and consistent with international agreements.

C10.3.4.1. Requests for waivers and exemptions to QD criteria shall be IAW DoD Component directives. When joint operations are being conducted from a single base or location, waivers and exemptions that affect another DoD Component must be coordinated between affected DoD Components.

C10.3.4.2. Requests for waivers and exemptions to QD criteria shall contain the following:

C10.3.4.2.1. A risk analysis for the proposed operation weighing the need to conduct the operation and violate the standards against the potential effect of an accident (e.g., mission impact, loss of resources, turnaround times).

C10.3.4.2.2. A timeline listing milestones which shall eliminate the need for the waiver or exemption.

C10.4. QD CRITERIA FOR CONTINGENCIES, COMBAT OPERATIONS, MOOTW AND ASSOCIATED TRAINING

QD criteria are provided for specific types of locations below:

C10.4.1. BLAHA

C10.4.1.1. General. To fulfill their missions, certain units must keep their basic load ammunition in armored vehicles, trucks, trailers, structures, or on pads. This involves acceptance of greater risks to unit personnel, facilities, and equipment than permitted by other chapters of this Standard. The concept of BLAHA storage may also be used to provide QD separations during mobile operations. A Basic Load Storage Area (BLSA) is a location containing multiple BLAHA.

C10.4.1.2. Mixing of Basic Load Ammunition. Storage compatibility requirements of Chapter 3 do not apply to BLAHA facilities.

C10.4.1.2.1. NEWQD for use with BLAHA QD criteria shall be determined as follows:

C10.4.1.2.1.1. The sum of the weights of all energetic compositions contained in munitions hazard classified as HD 1.1 or 1.5 shall be used.

C10.4.1.2.1.2. The sum of the explosive weight of all HD 1.2 AE shall be used. The propellant weight of a HD 1.2 item (if present) may be disregarded.

C10.4.1.2.1.3. The weights of energetic compositions hazard classified as HD 1.3 may be disregarded. However, if the site only contains HD 1.3 items, the criteria contained in paragraph C9.4.3. apply.

C10.4.1.2.1.4. The weights of energetic compositions classified as HD1.4 may be disregarded.

C10.4.1.2.1.5. The explosive weight of HD 1.6 shall be computed as follows:

C10.4.1.2.1.5.1. When HD 1.6 is stored alone or with HD 1.4 AE, the QD criteria of paragraph C9.4.3. apply.

C10.4.1.2.1.5.2. When HD 1.6 is stored with AE classified as HD 1.1, HD 1.2, or HD 1.5, add the explosives weight of the HD 1.6 items into the NEWQD calculations.

C10.4.1.2.1.5.3. When HD 1.6 is stored with AE classified as HD 1.3 add the explosives weights of HD1.3 and HD 1.6. The QD criteria in paragraph C9.4.3. apply.

C10.4.1.2.2. Explosives Limits

C10.4.1.2.2.1. The maximum NEWQD at any BLAHA in a BLSA storing mixed compatibility must not exceed 8,818 lbs [4,000 kg]. A BLSA may have multiple 8,818-lb [4,000 kg] BLAHA, provided the BLAHA are separated from each other by the applicable distances (D1, D2 and D3) given in Table C10.T1.

C10.4.1.2.2.2. When the NEWQD of a BLSA or a BLAHA exceeds 8,818 lbs [4,000 kg], the QD computations and HD mixing rules for the site shall be IAW Chapter 9 and the explosives compatibility storage criteria shall be IAW Chapter 3.

C10.4.1.2.3. QD Computations

C10.4.1.2.3.1. The total NEWQD of AE in each site shall be used for computation of QD provided the required distances (Table C10.T1.) necessary to prevent propagation separate these sites. If the separation distances are not met, the entire BLSA shall be considered one site and subparagraph C10.4.1.2.2.2. applies.

C10.4.1.2.3.2. The IMD requirements of Chapter 9 apply when using 3-Bar or 7-Bar ECM.

C10.4.1.2.3.3. Table C10.T1. contains the QD separation for BLAHA and BLSA.

C10.4.1.2.3.4. Heavy armored vehicles are expected to contain most of the blast and fragments from an internal explosion and are well protected from an external explosion. For this reason there is no required separation from heavy armor PES to light or non-armored ES. Additionally, heavy armor ES require no separation from other sites. The hatches of heavy armored vehicles must be kept closed to be considered as heavy armor vehicles; otherwise, they are considered as light armor vehicles. Use Table C10.T2. to determine the applicable QD for heavy, light and non-armored vehicles.

Table C10.T1. QD for BLAHA and BLSA

NEW (lbs) [kg]	D1[1] (ft) [m]	D2[2] (ft) [m]	D3[3] (ft) [m]	D4[4] (ft) [m]	D5[5] (ft) [m]	D6[6] (ft) [m]
10	4	13	26	591	886	66
4.5	*1.3*	*3.9*	*7.9*	*180*	*270*	*20*
15	5	15	30	591	886	66
6.8	*1.5*	*4.5*	*9.0*	*180*	*270*	*20*
20	5	16	33	591	886	66
9.1	*1.7*	*5.0*	*9.9*	*180*	*270*	*20*
30	6	19	37	591	886	66
13.6	*1.9*	*5.7*	*11.4*	*180*	*270*	*20*
50	7	22	44	591	886	66
22.7	*2.2*	*6.7*	*13.5*	*180*	*270*	*20*
70	8	25	49	591	886	66
31.8	*2.5*	*7.5*	*15.1*	*180*	*270*	*20*
100	9	28	56	591	886	66
45.4	*2.8*	*8.5*	*17.0*	*180*	*270*	*20*
150	11	32	64	591	886	81
68.0	*3.2*	*9.7*	*19.4*	*180*	*270*	*24.6*
200	12	35	70	591	886	99
90.7	*3.6*	*10.7*	*21.4*	*180*	*270*	*30.0*
300	13	40	80	591	886	130
136.1	*4.1*	*12.2*	*24.5*	*180*	*270*	*39.6*
500	16	48	95	591	886	
226.8	*4.8*	*14.5*	*29.0*	*180*	*270*	
700	18	53	107	591	886	
317.5	*5.4*	*16.2*	*32.5*	*180*	*270*	
1,000	20	60	120	591	886	
453.6	*6.1*	*18.3*	*36.6*	*180*	*270*	
1,500	23	69	137	591	886	
680.4	*7.0*	*20.9*	*41.9*	*180*	*270*	
2,000	25	76	151	591	886	
907.2	*7.7*	*23.0*	*46.1*	*180*	*270*	
3,000	29	87	173	591	886	
1,360.8	*8.8*	*26.4*	*52.8*	*180*	*270*	
5,000	34	103	205	591	886	
2,268.0	*10.4*	*31.3*	*62.5*	*180*	*270*	
7,000	38	115	230	669	1021	
3,175.1	*11.7*	*35.0*	*70.0*	*204.0*	*306.0*	
8,818	41	124	248	751	1146	
4,000	*12.6*	*37.8*	*75.6*	*229.0*	*343.4*	

Notes for Table C10.T1.:

1. D1 is used for:
   a. Side-to-side, side-to-rear and rear-to-rear exposures between Undefined ECM, provided the earth cover complies with subparagraph C5.2.1.3. and the explosives are stored at least 3 ft [1 m] from the end of the ECM.
   b. Non-armored vehicle (PES) to non-armored vehicle (ES) when an adequate barricade IAW section C5.3. is located between them.

c. Light armored vehicle (PES) to non-armored vehicle (ES) when an adequate barricade IAW section C5.3. is located between them.

d. Light armor or non-armored vehicle (PES) to light armored vehicle (ES) when an adequate barricade IAW section C5.3. is located between them.

e. Determining D1 and NEWQD for D1 (NEWQD in lbs, D1 in ft):

$D1 = 2*NEWQD^{1/3}$ [English EQN C10.T1-1]

$NEWQD = (D1/2)^3$ (8,818 lbs maximum) [English EQN C10.T1-2]

f. Determining D1 and NEWQD for D1 (NEWQD in kg, D1 in m)

$D1 = 0.79 * NEWQD^{1/3}$ [Metric EQN C10.T1-3]

$NEWQD = (D1/0.79)^3$ (4,000 kg maximum) [Metric EQN C10.T1-4]

2. D2 is used for:

a. Front-to-front exposures involving Undefined ECM when there is an adequate barricade (section C5.3.) at the ES.

b. Non-armored or light armored vehicles to the side or rear of an Undefined ECM.

c. Determining D2 and NEWQD for D2 (NEWQD in lbs, D2 in ft):

$D2 = 6*NEWQD^{1/3}$ [English EQN C10.T1-5]

$NEWQD = (D2/6)^3$ (8,818 lbs maximum) [English EQN C10.T1-6]

d. Determining D2 and NEWQD for D2 (NEWQD in kg, D2 in m)

$D2 = 2.38 * NEWQD^{1/3}$ [Metric EQN C10.T1-7]

$NEWQD = (D2/2.38)^3$ (4,000 kg maximum) [Metric EQN C10.T1-8]

3. D3 is used for:

a. Non-armored vehicles to non-armored vehicles without an adequate barricade.

b. Light armored vehicles to non-armored vehicles without an adequate barricade at the non-armored vehicles.

c. Undefined ECM to Undefined ECM when positioned front-to-front and no barricade is present.

d. Non-armored vehicles, light armored vehicles or Undefined ECM to the front of Undefined ECM when no barricade is present at the ES.

e. Determining D3 and NEWQD for D3 (NEWQD in lbs, D3 in ft):

$D3 = 12*NEWQD^{1/3}$ [English EQN C10.T1-9]

$NEWQD = (D3/12)^3$ (8,818 lbs maximum) [English EQN C10.T1-10]

f. Determining D3 and NEWQD for D3 (NEWQD in kg, D3 in m)

$D3 = 4.76 * NEWQD^{1/3}$ [Metric EQN C10.T1-11]

$NEWQD = (D3/2.38)^3$ (4,000 kg maximum) [Metric EQN C10.T1-12]

4. D4 is used for PTRD from non-armored and light armored vehicles.

a. Determining D4 and NEWQD for D4 (NEWQD in lbs, D4 in ft):

$NEWQD \leq 5{,}500$ lbs D4 = 591 ft.

$5{,}500 \text{ lbs} < NEWQD \leq 8818$ lbs $D4 = 8*NEWQD^{1/2}$ [English EQN C10.T1-13]

$D4 < 591$ ft NEWQD = 0 lbs

$591 \text{ ft} \leq D4 \leq 751$ ft $NEWQD = (D4/8)^2$ (8,818 lbs maximum) [English EQN C10.T1-14]

b. Determining D4 and NEWQD for D4 (NEWQD in kg, D4 in m)

$NEWQD \leq 2{,}495$ kg D4 = 180 m

$2{,}495 \text{ kg} < NEWQD \leq 4000$ KG $D4 = 3.62 * NEWQD^{1/2}$ [Metric EQN C10.T1-15]

$D4 < 180$ m NEWQD = 0 kg

$180 \text{ m} \leq D4 \leq 229$ m $NEWQD = (D4/3.62)^2$ (4,000 kg maximum) [~~English~~*Metric* EQN C10.T1-16]

5. D5 is the IBD from non-armored and light armored vehicles.

a. Determining D5 and NEWQD for D5 (NEWQD in lbs, D5 in ft):

$NEWQD \leq 5{,}500$ lbs D5 = 886 ft.

$5{,}500 \text{ lbs} < NEWQD \leq 8818$ lbs $D5 = 12.2*NEWQD^{1/2}$ [English EQN C10.T1-17]

$D5 < 886$ ft NEWQD = 0 lbs

$886 \text{ ft} \leq D5 \leq 1146$ ft $NEWQD = (D5/12.2)^2$ (8,818 lbs maximum) [English EQN C10.T1-18]

b. Determining D5 and NEWQD for D5 (NEWQD in kg, D5 in m)

$NEWQD \leq 2{,}495$ kg D5 = 270 m

$2{,}495 \text{ kg} < NEWQD \leq 4000$ KG $D5 = 5.43 * NEWQD^{1/2}$ [Metric EQN C10.T1-19]

D5 < 270 m NEWQD = 0 kg
270 m ≤ D5 ≤ 343.4 m NEWQD = $(D5/5.43)^2$ (4,000 kg maximum) [Metric EQN C10.T1-20]

6. D6 is used to determine the IBD and PTRD from heavy armor vehicles. When NEWQD exceeds 331 lb [150 kg] the IBD and PTRD specified in Chapter 9 apply.
   a. Determining D6 and NEWQD for D6 (NEWQD in lbs, D6 in ft):
      NEWQD ≤ 110 lbs D6 = 66 ft
      110 lbs < NEWQD ≤ 331 lbs $D6 = -4.49 + 0.487*(NEWQD^{1/3}) + 2.928*(NEWQD^{1/3})^2$ [English EQN C10.T1-21]
      D6 < 66 ft NEWQD = 0 lbs
      66 ft ≤ D6 ≤ 138 ft $NEWQD = (0.0833 + [1.5421 + 0.3416*D6]^{1/2})^3$ [English EQN C10.T1-22]
   b. Determining D6 and NEWQD for D6 (NEWQD in kg, D6 in m)
      NEWQD < 50 kg D6 = 20 m
      50 ≤ NEWQD ≤ 150 kg $D6 = -1.37 + 0.193*(NEWQD^{1/3}) + 1.512*(NEWQD^{1/3})^2$ [Metric EQN C10.T1-23]
      D4 < 20 m NEWQD = 0 kg
      20 m ≤ NEWQD ≤ 42.3 m $NEWDQ = (0.0640 + [0.9108 + 0.6615*D6]^{1/2})^3$ [Metric EQN C10.T1-24]

Table C10.T2. QD Requirements for Armored Vehicles [1]

TO ES	EXPOSURE	FROM PES		
		HEAVY	LIGHT	NON-ARMORED
HEAVY	IMD	N/R	N/R	N/R
LIGHT	IMD	N/R	D1 from C10.T1	D1 from C10.T1
NON-ARMORED	IMD	N/R	D3 from C10.T1	D3 from C10.T1
	IBD	D6 from C10.T1	D5 from C10.T1	D5 from C10.T1
	PTRD	D6 from C10.T1	D4 from C10.T1	D4 from C10.T1

Notes for Table C10.T2.:

1. Application of D1 and D2 distances above may require the use of a barricade between PES and ES. Refer to Table C10.T1. notes regarding the need for a barricade.
2. N/R = IMD Not Required (N/R)
3. Use $d = 24W^{1/3}$ ~~[9.52 $W^{1/3}$]~~ [English EQN C10.T2-1] *and [$d = 9.52\ Q^{1/3}$]* [Metric EQN C10.T2-2] or $d = 30W^{1/3}$ ~~[11.90 $W^{1/3}$]~~ [English EQN C10.T2-3] *and [$d = 11.90\ Q^{1/3}$]* [Metric EQN C10.T2-4] instead of D1 and D3 for asset preservation.

C10.4.2. Ports. The following criteria shall apply to ports where DoD AE are loaded or unloaded.

C10.4.2.1. Explosives Piers

C10.4.2.1.1. AGM IMD (K11[4.36]) shall be maintained between explosives piers.

C10.4.2.1.2. ILD (K18 [7.14]) shall be maintained from an explosives pier to a non-explosives pier used for the handling of military cargo.

C10.4.2.1.3. AGM IMD (K11 [4.36]) shall be maintained to AE holding areas based on the NEWQD at the pier.

C10.4.2.1.4. Marshalling Yards shall be located at PTRD from explosives piers.

C10.4.2.1.5. Railheads used for long-term storage or as a transfer depot shall be sited at AGM IMD (K11 [4.36]) from an explosives pier based on the NEWQD at the pier.

C10.4.2.2. Explosives anchorages. The criteria of Chapter 9 apply with the following exceptions:

C10.4.2.2.1. ILD (K18 [7.14]) shall be provided between the explosives loading or unloading section of the anchorage and the loaded ship section of the explosives anchorage (see Figure C9.F10.).

C10.4.2.2.2. An explosives anchorage shall be located at K40 [15.87] from all piers. However, where necessary for security or navigational reasons, this distance may be reduced to ILD (K18 [7.14]) when the piers are only used for DoD operations. PTRD may be applied for asset preservation. A separation distance of K40 [15.87] shall be maintained to all non-DoD related piers.

C10.4.2.2.3. ILD (K18 [7.14]) is permitted between an explosives anchorage and a non-explosives DoD-related anchorage. K40 [15.87] shall be maintained between an explosives anchorage and a non-explosives, non-DoD related anchorage.

C10.4.2.3. AE Facilities

C10.4.2.3.1. AE Holding Areas. These holding areas are used in support of AE loading and unloading of ships. Typically, AE being held at these locations are only present for a short time. The NEWQD associated with the AE holding area shall be based on all AE present at the site. The following apply to AE holding areas:

C10.4.2.3.1.1. ILD (K18 [7.14]) shall be maintained to both explosives and non-explosives piers based on the NEWQD present at the AE holding areas.

C10.4.2.3.1.2. PTRD shall be maintained to an explosives or non-explosives Marshalling Yard.

C10.4.2.3.1.3. Railheads used for AE holding areas storage or as a transfer depot shall be sited at AGM IMD (K11 [4.36]) from an AE holding areas based on the NEWQD at the AE holding areas.

C10.4.2.3.2. Marshalling Yards. PTRD shall be maintained between marshalling yards and explosives piers or AE holding areas. The location of the marshalling yard will typically be governed by the NEWQD at the other PES. When operational necessity dictates, marshalling yards may be separated by ILD (K18 [7.14]) to any nearby manned explosives operations and AGM IMD (K11 [4.36]) to any nearby unmanned explosives storage operations.

C10.4.2.3.3. Loading Docks. Loading docks shall be sited at IMD (K11 [4.36]) from all ES.

C10.4.2.3.4. Classification Yards. Use criteria provided in paragraph C9.8.2.

C10.4.2.3.5. Railheads. Based on its use, a railhead shall be sited as a classification yard, AE holding area, or a loading dock.

C10.4.3. Field Storage and Handling Areas. These areas shall be sited IAW Table C10.T3. Use separation distances from the applicable QD tables in Chapter 9 for the HD and NEWQD of the AE involved with the PES. AE will be segregated IAW Chapter 3 by storage CG. The clear zone surrounding the field storage and handling areas is bounded by the applicable IBD. No unrelated, occupied structures are permitted within this zone.

C10.4.3.1. These areas may consist of all or some of the following explosives locations:

C10.4.3.1.1. Field Storage Sections. These sections are used to store AE. Field storage sections are used for dispersing AE in multiple, widely-separated storage sections~~; this arrangement protects~~ *to prevent* the loss of ~~other~~*any one* section~~s~~ from *causing* the loss of ~~any one~~ *other* section*s*, ~~which would~~ *thereby* seriously degrad~~e~~*ing* the mission. AE may be stored in existing structures, caves, and tunnels as prescribed in Chapter 9. The construction and use of barricades and revetments shall be IAW Chapter 5.

C10.4.3.1.2. AE Staging Area. These areas are normally used for temporary holding of outgoing AE and for ready access to Combat Aircraft Loading Areas (CALA).

C10.4.3.1.3. Captured Enemy Ammunition Area. A separate area shall be provided for the storage of captured enemy AE. Captured enemy AE that cannot be identified shall be treated as HD 1.1.

C10.4.3.1.4. AE Operations Area. An area used for operations such as minor maintenance and repair of AE or their containers, surveillance, segregation, or weapons assembly.

C10.4.3.1.5. AE Destruction Area. An area used for disposal of AE. It may consist of a burning area, a demolition area, or both.

C10.4.3.1.6. Sling-out Area. An area used for moving AE by rotary-wing aircraft.

C10.4.3.2. These areas may consist of all or some of the following non-explosives locations:

C10.4.3.2.1. Administration and Billeting Areas. Inhabited locations not directly related to the daily operations of the field storage and handling areas.

C10.4.3.2.2. Manned Support Facilities. Facilities directly supporting AE operations (e.g., field offices and AE support equipment maintenance facilities).

C10.4.3.2.3. Unmanned Support Facilities. Unmanned locations supporting AE operations (e.g., forklift charging stations, dunnage storage, and buildings that store inert materials). A minimum 50 ft [15.2 m] separation distance shall be maintained from these locations to any PES.

C10.4.3.3. Modular Storage. A barricaded area comprised of a series of connected cells with hard surface storage pads separated from each other by barricades (see paragraph C5.2.2.).

C10.4.3.4. Commercial Intermodal Containers (CIC). Containers used for transporting AE may be used for AE storage and shall be sited as AGM.

Table C10.T3. QD for Field Storage and Handling Areas

TO	FROM: Storage Sections	AE Staging Area	Captured Enemy Ammunition Area	AE Operations Area	Sling Out Area Area	AE Destruction Area
Storage Sections	IMD Note 1	IMD Note 1	PTRD[2] PTRD[2]	IMD Note 1	IMD Note 1	Note 4
AE Staging Area	IMD Note 1	IMD Note 1	PTRD[2] PTRD[2]	IMD Note 1	IMD Note 1	Note 4
Captured Enemy Ammunition Area	IMD Note 1	IMD Note 1	IMD PTRD[2]	IMD Note 1	IMD Note 1	Note 4
AE Operations Area	IMD Note 1	IMD Note 1	PTRD[2] PTRD[2]	IMD Note 1	IMD Note 1	Note 4
Sling-Out Area	N/R Note 1	N/R Note 1	PTRD[2] PTRD[2]	IMD Note 1	IMD Note 1	Note 4
Administrative and Billeting Area	IBD[3] IBD[3]	IBD[3] IBD[3]	IBD[3] IBD[3]	IBD[3] IBD[3]	IBD[3] IBD[3]	Note 4
Boundaries	IBD[3] IBD[3]	IBD[3] IBD[3]	IBD[3] IBD[3]	IBD[3] IBD[3]	IBD[3] IBD[3]	Note 4
Manned Non-Explosive Support Facility	ILD Note 1	ILD Note 1	IBD[3] IBD[3]	ILD Note 1	ILD Note 1	Note 4
Unmanned Non-Explosive Support Facility	N/R Note 1	N/R Note 1	PTRD[2] PTRD[2]	N/R Note 1	N/R Note 1	Note 4
AE Destruction Area	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4

Notes for Table C10.T3.:

N/R = Not Required

1. The distance criteria in the upper half of each row are the minimum separation distances required per Chapter 9. The distance criterion in the lower half of each row is the asset preservation distance. For HD 1.1 material, use $d = 24W^{1/3}$ ~~[$9.52 W^{1/3}$]~~ [English EQN C10.T3-1] *and [$d = 9.52 Q^{1/3}$]* [Metric EQN C10.T3-2] or $d = 30W^{1/3}$ ~~[$11.90 W^{1/3}$]~~ [English EQN C10.T3-3] *and [$d = 11.90 Q^{1/3}$]* [Metric EQN C10.T3-4]. For HD 1.2, 1.3, or 1.4 apply PTRD from Chapter 9.
2. PTRD includes minimum fragment distance.
3. IBD includes minimum fragment distance.
4. IAW paragraphs C9.8.3. and C9.8.4.

C10.4.4. FARP. Storing AE and fuel at the same location is inherently hazardous and should be avoided when possible. If it is necessary to refuel and rearm aircraft at the same location, all precautions must be made to minimize the hazards involved in these operations. Armament pads shall contain the minimum amount of AE to conduct efficient operations. For

example, where armament pads support only one aircraft, that pad shall be restricted to the amount of ammunition necessary to rearm that aircraft.

C10.4.4.1. Required Separations

C10.4.4.1.1. Use K24 [9.52] for asset preservation between FARP and other ES.

C10.4.4.1.2. FARP shall be separated by IBD from all non-associated inhabited buildings.

C10.4.4.1.3. AE-ready storage (i.e., AE staged to support the next load) shall be separated by AGM IMD from the armament pads with only armament pads considered as the PES. Ready AE storage structures and locations shall be separated from other ready AE storage structures and locations by AGM IMD.

C10.4.4.1.4. Build-up locations shall be separated by AGM IMD from all other explosives storage and operations with only the build-up locations considered as the PES.

C10.4.4.1.5. Distances prescribed by the owning DoD Component shall separate other support structures and sites.

C10.4.4.1.6. AE shall be separated from operational fuel supplies by at least 100 ft [30.5 m]. Fuel supplies shall be diked or placed downhill from AE.

C10.4.5. Airfield Operations. Special consideration must be given to phased plans where the peacetime operation and positioning of aircraft transitions to contingency operations with increased quantities and use of AE. Exposures given adequate protection under the peacetime phase may be at greater risk during the contingency phase. Commanders must consider these changes when approving these plans. The proper use of such features as barricades or earth-filled, steel-bin-type barricades (ARMCO revetment or equivalent (see section C5.3.)) can decrease the magnitude of a potential event and increase the explosives capacity of limited areas.

C10.4.5.1. Airfield QD Criteria for PES. Table C10.T4. provides criteria for airfield PES.

C10.4.5.2. Airfield QD Criteria for ES

C10.4.5.2.1. Runways, Taxiways and Aircraft

C10.4.5.2.1.1. For military use only, use Table C10.T4.

C10.4.5.2.1.2. For joint use, use criteria in Table C9.T24.

C10.4.5.2.2. Combat Aircraft Support Facilities

C10.4.5.2.2.1. Unhardened combat aircraft support facilities shall be separated from AE storage and operating facilities by K30 [11.9]. For asset preservation, apply incremental K40 [15.87] to K50 [19.84] based on the NEWQD.

C10.4.5.2.2.2. If these functions are located in a HAS, separation may be reduced to K18 [7.14] to the sides or rear of the HAS.

C10.4.5.2.2.3. Other hardened facility sitings require DDESB approval.

C10.4.5.2.2.4. When operational necessity dictates, separation distances less than K18 [7.14] may be approved for ES; however, it must be demonstrated that protection equivalent to K18 [7.14] is being provided.

C10.4.6. Static Missile Battery Separation. To ensure optimal effectiveness, offensive and defensive missile batteries many times must be deployed in a static (non-mobile role) in the proximity of other AE operations such as field storage or flight lines. The following criteria apply to deployed static missile batteries and associated support functions:

C10.4.6.1. IMD (K11 [4.36]) shall be maintained between missile launchers, reloads and other AE storage locations to include parked AE-loaded aircraft.

C10.4.6.2. Missile batteries deployed within the IBD of AE storage areas may be sited at K18 [7.14] to manned functions considered related to area AE operations. Likewise, missile batteries deployed in the clear zones of flight line operations may be sited at K18 [7.14] to manned flight line facilities.

C10.4.6.3. Those functions solely providing support to static missile units, such as motor pools, may be sited at K18 [7.14] to batteries and other AE activities when the missile battery is located in these areas. For asset preservation, use PTRD.

C10.4.6.4. No separation is required between missile batteries and the security force structures exclusively supporting them.

C10.4.7. Emergency Destruction. When it becomes necessary to destroy stores of AE to prevent them from falling to the enemy, care must be taken to ensure that assets otherwise not in danger of falling to the enemy are not destroyed by blast or fragments. The DoD Components shall develop specific guidance for the implementation of and training for emergency destruction of munitions. Normal disposal operations shall be conducted IAW paragraphs C9.8.3. and C9.8.4.

C10.4.8. Separation From Fuel

C10.4.8.1. Operational Storage. Quantities up to 500 gallons [1,893 liters] shall be separated from each PES by at least 50 ft. [15.24 m]. Quantities between 500 to 5,000 gallons

[1,893 to 18,927 liters] shall be separated from each PES by at least 100 ft. [30.5 m]. Fuel should be located downhill and diked to contain a possible fuel spill.

C10.4.8.2. Bulk Fuel Storage. For more than 5,000 gallons [18,927 liters] apply paragraph C9.8.14.

Table C10.T4. QD for Contingency, Combat, and MOOTW Airfields

TO ES	FROM AIRFIELD PES: MINIMUM SEPARATION DISTANCE	FROM AIRFIELD PES: ASSET PRESERVATION DISTANCE
Manned functions not related to the combat mission	IBD	IBD
Base boundaries without an easement unless manifestly unsuitable	IBD	IBD
Crew support and billeting areas	IBD	IBD
Central airfield support facilities	ILD	Note 1
Functions related to the explosives mission (manned)	ILD	Notes 1,2
Flight line fire and rescue services	ILD	Note 1
Manned munitions operating locations (assembly, maintenance, refurbishment, etc)	ILD	Note 1
To any other explosives loaded aircraft or CAPA	IMD	Notes 1,2
Flight line Munitions HA	IMD	Notes 1,2
Military use runways and taxiways	$D=4.5*NEWQD^{1/3}$ [*$D=1.79*NEWQD^{1/3}$*]	Notes 1,2

Notes for Table C10.T4.:

1. For HD 1.1 material, use $d = 24W^{1/3}$ ~~[$9.52\ W^{1/3}$]~~ [English EQN C10.T4-1] *and [$d = 9.52\ Q^{1/3}$]* [Metric EQN C10.T4-2] or $d = 30W^{1/3}$ ~~[$11.90\ W^{1/3}$]~~ [English EQN C10.T4-3] *and [$d = 11.90\ Q^{1/3}$]* [Metric EQN C10.T4-4]. For HD 1.2, 1.3, or 1.4 apply PTRD from Chapter 9.
2. For aircraft, asset preservation distances may not provide protection from fragments. To protect against low-angle, high-energy fragments, aircraft should be barricaded.